MIL-STD-40051B/2361B CHANGES WHERE IS REVISION C GOING

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CHANGES TO MIL-STD-40051B MIL-STD-2361B

MIL-STD-40051B Changes

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- Warning summary is as needed, instead of required
- Change transmittal page is as needed, instead of required
- Appendix A added content matrix for frame-based –13&P and –14&P
- All figures and tables require both numbering and a title
- Preferred method to arrange figure callouts are clockwise

  NOTE: C will require clockwise ONLY
- Figure callout reference requires a -
  - Figure number
  - Callout number
- Allow grouping of warning, cautions, and notes
  - Only allowed to group similar alert types
  - Separated by bullets
  - Reduce number of heading for each group of alerts

MIL-STD-40051B Changes

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- **General Information WP (<ginfowp>)**
  - **Moved to General Info, Equip Desc and Theory Chapter (GIM) (<gim>)**
  - **Deleted the Abbreviation (<abbrevwp>) and Symbol WP (<symbolwp>) and moved the information into it**
- **Require both CAGEC and part number**
- **Supporting Information WPs Unit of Measure (U/M) was changed to Unit of Issue (U/I)**
- **Added “current as of” date for the all TMs indicating the latest RPSTL information**
- **Framed-based work packages require a sequence number**

Figure Callout Reference

- **MIL-STD-40051A**

  1. Remove ladder (1) from storage brackets on exterior entry end of shelter.

- **MIL-STD-40051B**

  1. Remove ladder (figure 3, item 1) from storage brackets on exterior entry end of shelter.

Grouping Warning, Caution & Note

- **MIL-STD-40051A**

WARNING

Be careful not to contact high-voltage connections when removing, installing, or operating equipment.

WARNING

Do not be misled by the term low voltage. Voltages as low as 50 volts may cause death.

- **MIL-STD-40051B**

WARNING

- **Be careful not to contact high-voltage connections when removing, installing, or operating equipment.**
- **Do not be misled by the term low voltage. Voltages as low as 50 volts may cause death.**

- **Can not mix warning, caution, or note together – MUST be separate groups.**

Changes in MIL-STD-2361B DTD

- **Updated from SGML to XML**
  - Required DTD changes
  - Some new elements created to indicate unique content requirements
- **All figures and tables**
  - Requires a title
  - No option to not allow numbering
- **Allow grouping of warning, cautions, and notes**
- **General Information WP (<ginfowp>)**
  - Moved to General Info, Equip Desc and Theory Chapter (GIM) (<gim>)
  - Deleted the Abbreviation (<abbrevwp>) and Symbol WP (<symbolwp>) and moved the information into it
- **Graphic hotspot mapping**
- **Require both CAGEC and part number**
  - `<partno>0-E-760</partno><cageno>81348</cageno>`
- **NSN requires FSC and NIIN**
  - `<nsn><fsc>6665</fsc><niin>01-372-1303</niin></nsn>`

Changes in MIL-STD-2361B DTD

- **Supporting Information verbatim statements are generated from style sheet and not referenced text**
  - **User only supplies unique information**
- **Distribution Statements are generated from style sheet and not referenced text**
  - **User only supplies unique information**
- **Removed <wpinfo>, as per MIL-STD 40051, for**
  - **PMCS Introduction WP <pmcsintrowp>**
  - **Torque WP <torquewp>**
  - **Troubleshooting Index WP <tsindxwp>**
- **Removed from the DTD since functional requirements are not part of MIL-STD-40051**
  - **Pilot Operating Procedure (<pop>) Chapter**
  - **Aircraft Shipping Chapter (<shipim>)**
  - **Associated elements**

Graphic Hot Spot

- Graphic hot spotting is determined by mapping a shape to the graphic.
- Knowing the size of the graphic, hot spots are mapped using x,y coordinates
- Hot spotting has three shapes
  - Circle
    - *Use x,y coordinates for circle center and radius attribute for circle size*
  - Rectangle
    - *Use two x,y coordinates to provide the upper-left and lower-right corners*
  - Polygon
    - *Use multiple x,y coordinates to draw line from each coordinate*
    - *Last coordinate connects with the first coordinate*
    - *Using polygon to create a square*

```
<map.polygon>
   <map.coord x="1in" y="1in"/><map.coord x="1in" y="2in"/>
   <map.coord x="2in" y="2in"/><map.coord x="2in" y="1in"/>
</map.polygon>
```

Verbatim Text

- **Using the Additional Authorized List (AAL) WP**

- **MIL-STD-40051A**

```
<!ELEMENT aalwp - - (wpidinfo, intro, aal)>
```

- **MIL-STD-40051B**

```
<!ELEMENT aalwp (wpidinfo, (uoc, modelno)*, aal)>
```

MIL-STD-40051C REORGANIZATION

Why Revision “C”

- **MIL-STD 40051C needs to add**
  - **IETM functionality**
    - ***Intrusive Diagnostics***
    - ***Parts “Part and Click”***
  - **Standard “Look and Feel” (LnF) requirements**
  - **Multi-Service**
  - **Additional requirements**
- **Some users have asked for better organization**

MIL-STD-40051C Realignment

- **MIL-STD-40051 will have three separately indexed parts (volumes) as follows:**
  - **MIL-STD-40051-1, Content Requirements for Technical Manuals**
  - **MIL-STD-40051-2, IETM Functionality and Look and Feel Requirements**
  - **MIL-STD-40051-3, Style and Format Requirements for Page-Based Technical Manuals**

- **Retain MIL-HDBK-1222 for guidance that cannot be put in a standard.**
  - **Move style information from the handbook to the standard.**
    - ***Provide a common IETM "Core" functions***
    - ***Provide a common LnF to TMs***
    - ***Common/similar view IETM***
  - **Move some guidance requirements to standard requirements**
    - ***Limiting number of procedural steps***
    - ***Change requirements***

Content Requirements Old vs.. New

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MIL-STD 40051B

BASIC
- Section 1
- Section 2
- Section 3
- Section 4
- Section 5
- Section 6
- Appendix A - Matrix
- Index

Part 1 General Info
Equipment Desc
Theory

Part 2 Operator

Part 3 Troubleshooting

Part 4 Maintenance

Part 5 Parts

Part 6 Supporting

MIL-STD 40051C

PART 1
- Section 1
- Section 2
- Section 3
- Section 4
- Section 5
- Section 6
- Appendix A - Matrix
- Appendix B - General Info, Equip
- Appendix C - Desc Operator
- Appendix D - Troubleshooting
- Appendix E - Maintenance
- Appendix F - Parts
- Appendix G - Supporting
- Appendix H – Unique Page-Based
- Appendix I – Unique IETM Index

IETM Functional and LnF Old vs. New

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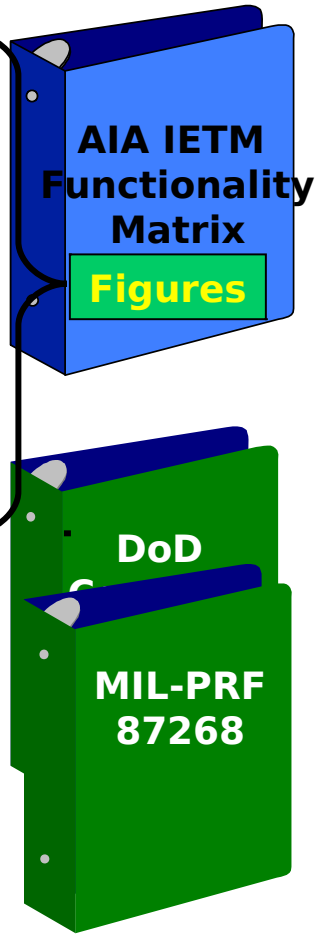
MIL-STD 40051B

- Part 1 General Info
  - Equipment Desc
  - Theory
- Part 2 Operator
- Part 3 Troubleshooting
- Part 4 Maintenance
- Part 5 Parts
- Part 6 Supporting

MIL-HDBK 1222B

- Section 5 Frame-Based TM
  - TM Dev
- Section 6 Graphics
- Section 7
  - Changes/Revisions
- Section 9 Security
- Appendix A CD-ROM Prep



MIL-STD 40051C

PART 2

- Section 1 - Scope.
- Section 2 - Applicable documents
- Section 3 - Definitions
- Section 4 - General requirements
- Section 5 - Detailed requirements
  - Selection Matrix
- Appendix B - Look and Feel
  - Selection Matrix
- Appendix C – CD-ROM Prep
- Appendixes - Others as required

Page Style and Format Old vs. New

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MIL-STD 40051B

- Part 1 General Info
  Equipment Desc
  Theory
- Part 2 Operator
- Part 3 Troubleshooting
- Part 4 Maintenance
- Part 5 Parts
- Part 6 Supporting

Figures

MIL-HDBK 1222B

- Section 4 Page-Based TM Dev
- Dev
- Section 6 Graphics
- Section 7
- Changes/Revisions
- Section 9 Security
- Appendix C Guide
- LOEP/WP

MIL-STD 40051C

PART 3

- Section 1 - Scope.
- Section 2 - Applicable documents
- Section 3 - Definitions
- Section 4 - General requirements
- Section 5 - Detailed requirements

Selection Matrix

(?)

MIL-STD-40051C Changes

- **Samples will go into the part to which they apply**
  - Content samples in Part 1
  - IETM functionality and LnF in Part 2
  - Page-based style and format samples in Part 3
  - More frame-based (IETM) samples (both standard and handbook)
- **Clearly indicate in part 1 any unique content requirements**
  - IETM either marked or content unique in Appendix H
  - Page-based either marker or content unique in Appendix I
- **Add Marine Corps requirements**
- **Possibly ammunition requirements (MIL-PRF-63015 and 63016)**
- **No overall index, each part will have a separate index**

MIL-STD-40051C Additional Changes

- PMCS make option column for man-hours, instead of empty column
- Tasks will require title, no auto-generated titles
- Include in the Maintenance Work Package a Follow-on Task
- Include equipment effectivity at the step level
- Include troubleshooting processing/logical decision
- Include intrusive/automated troubleshooting capability
- Referencing
  - Allow only internal referencing (ID/IDREF) within a WP
  - References to other WPs or Documents using modified XLink
- Increase WP reusability between different systems

Rationale

- **Better organize the standard**
  - Separate the unique frame-based from the page-based requirements - Easier to apply the standard
  - Difficult and time-consuming to locate all the IETM or all the page-based requirements

- **Provide better IETM guidance on acquiring and functionality**
  - Referencing only to IETM Class provides inconsistent measuring tools
  - No common style or functionality from Army IETM to Army IETM

- **Contracting the standard easier having 3 indexed parts with page and frame requirements separated**
  - Contract an IETM, cite Parts 1 and 2, and the handbook
  - Contract an page-based TM, cite Parts 1 and 3, and the handbook

MIL-HDBK-1222C Changes

- **Smaller than current handbook**
- **Contains information that cannot be required and must remain as guidance only**
  - **Examples:**
    - ***Font table***
    - ***Graphics guidance***
    - ***Samples (both page and frame)***
    - ***Reading Grade Level (?)***
- **More samples to assist with implementation**

IETM SURVEY RESULTS OVERVIEW

Purpose of Survey

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Provide information and requirements necessary to revise

MIL-STD 40051/2361 and MIL-HDBK 1222/2361 for Interactive Electronic Technical Manuals (IETM) requirements and functionality for the Army

Sites Visited

- **Ft. Lee VA**
  - PEOs/PMs
  - CASCOM
- **Redstone Arsenal, AL**
  - PEOs/PMs
  - LOGSA
  - TMDE
  - MIMOSA
  - IADS
- **Aberdeen Proving Ground, MD**
- **Ft. Belvoir, VA**
  - PEOs/PMs
- **Alexandria, VA**
  - APD
  - AIA
  - ESSI
- **Ft Eustis VA**
  - ATSC
  - TRADOC PEOs/PMs Rock Island, IL
- **Warren, MI**
  - PEOs/PMs
  - EMS
- **Picatinny Arsenal, NJ**
  - Publication Personnel
- **Ft. Monmouth, NJ**
  - PEOs/PMs
  - Logistics Readiness Center (LRC)
- **HQ AMC**
  - National Maint Office (NMO)
  - APD
- **USMC**
- **IETM SMEC**

Survey Statistics

- **Personnel Interviewed**
  - Over 17 various Army organizations
  - Several industries representatives
  - USMC
  - Over 200 people interviewed
  - <25% had knowledge of MIL-STD 40051/2361
  - Majority had experience with ETMs (PDF)
  - 30%-40% had IETM knowledge (IADS, EMS, etc)

- **Survey Responses**
  - Approximately 50 questions in 10 groupings
  - Many questions answered at a general/high level.
  - Few specific recommendations

Survey Results
MIL-STD-40051 Functional Requirements Adequate

- **Generally technical content requirements are adequate**
- **IETMs the standard needs to address**
  - Navigation
  - Diagnostic data collection
  - Maintenance data collection
- **Include Additional Manual Types**
  - Support ammunition publications (Reviewing)
  - Aircrew flight manual (Not in C)
  - Support greater multi-service requirements (Incorporating)
- **Policy Concerns**
  - Government must own the data
  - Lack of enforceability
  - National Maintenance Program (NMP)
  - Two Level Maintenance

Survey Results
Troubleshooting Requirements Adequate

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- **Troubleshooting text requires**
  - Guidance how to use
  - Guidance to understand what is expected
  - Guidance displaying
  - Provide strong examples in the standard/ASRL
- **Provide diagnostic requirements for**
  - Interactive
  - Intrusive/Automatic diagnostics triggering
  - Dynamic (Future revision)
  - Knowledge model (Future revision)
- **Remove the IETM requirement for only an Operator Checkout/ Troubleshooting WP**
- **Capabilities**
  - History
  - Maintain Known/Unknown Faults and Reason for Test on the screen
  - Links/hooks to training scenarios
- **Graphic usage guidance**
  - Graphical resolution for zoom viewing
  - Augment text and line drawings through photos and multimedia
  - Do not allow IETM usage of graphical logic flow trees

Survey Results

LnF Requirements Standard or Handbook

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- **"Look and Feel" (LnF) Quandary**
  - Desire for common look and feel
    - *Firm requirements*
    - *Facilitates common training for multiple IETM systems*
  - Desire for flexibility
    - *No limits to what user can do*
    - *Incorporate new technology*
- **Standard Was Consensus Choice**
  - Recognize need for some given level of commonality
    - *Establish minimum/core set of requirements in standard*
    - *Handbook to contain rest of Look and Feel*
    - *Do not restrict additional functionality*
  - Include
    - *Screen layout/frames (not unanimous choice)*
    - *Button Definition and Function*
    - *Button Icon Symbols*

Survey Results

LnF Requirements Standard or Handbook

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- **Proposed Solutions**
  - **MIL-HDBK 1222**
    - ***Most requirements from handbook include into MIL-STD 40051***
    - ***LnF requirement be part two of MIL-STD 40051***
    - ***Handbook to contain guidance for options***
  - **Include in MIL-STD 40051**
    - ***As a minimum include IADS and EMS current capabilities***
    - ***Tri-Service IETM Working Group recommendations***
    - ***Consistent views***
    - ***Minimize scrolling***
    - ***MIL-PRF 87268 LnF requirements***
    - ***Screen layout/frames***
    - ***Button Icon Symbol(s) and Definition/Function***
    - ***Look and Feel Examples***

Survey Results

IETM Viewer System

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- **More favored commercial web browser**
  - Additional cost to maintain Army viewer
  - Assures migration path to emerging technologies
  - Broad based commercial support
  - Most users already familiar with browsers
- **Some favored a common Army viewer(s)**
  - Commercial web browsers can not provide all the required capabilities (i.e. MIL-STD-3008)
  - Concerns about compatibility
    - ***Between browsers***
    - ***Browser versions***
  - Changes to browser software not controlled by Army
- **No one favored a proprietary system**

Survey Results

Procedural Steps

- **Display**
  - Quandary
    - *Click, don't scroll*
    - *Scroll, don't click*
    - *Hard to view one step at a time*
  - Suggestions:
    - *Display as much as possible relying on IETM System*
    - *Show first level steps and expand/show subordinate steps*
- **Multimedia**
  - Should only augment the written procedures
  - IETM data presentation
    - *Text and illustrations are the primary*
    - *Multimedia are extra features*
- **Allow Annotations or Notes**
  - Some concern that notes
    - *Alter the official IETM*
    - *Used in place of ECP or 2028*

Survey Results
Alerts (Warning, Caution, and Note)

- **Requirements to Acknowledge**
  - Most did not want to acknowledge alerts by clicking even if grouped
  - Recognize as a legal issue
  - LOGSA recommends use what applies from MIL-PRF 87268 to the Army
- **Display Quandary**
  - Pop up window
    - *Best for recording acknowledgements*
    - *Alert pop ups and acknowledgements at the step 1 level*
      - Place icon adjacent to appropriate subordinate step
    - *Use an icon with a link to the text*
      - Expert does not have to review alerts, but must acknowledge
      - Novice must review and acknowledge each alert
    - *Should not require to re-view/re-acknowledge previous alerts*
      - If linked out and returns to procedure
      - If going back a step
  - Alert inline
    - *Displeasure with constant pop ups*
    - *Used to seeing alerts inline*
    - *If no acknowledgement requirement, makes option feasible*

Survey Results
Alerts (Warning, Caution, and Note)

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- **Options**
  - **Single step require**
    - ***Alert popup***
    - ***Status bar alert icon redisplay***
  - **Multiple steps are displayed four methods were discussed**
    - ***Force a new frame for each step that contains an alert***
      - **Alert popup**
      - **Status bar alert icon redisplay**
    - ***Alert icon next to the step***
      - **Restrict continuing in the IETM until each alert is acknowledged**
    - ***Display all alerts as pop-ups before the procedure is displayed and***
      - **Display inline**
      - **Place next to the step an alert icon for indication and redisplay**
    - ***Alerts inline with the step as displayed in page-based.***

Survey Results
Maintenance Data Collection for GCSS-A

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- **Communicate Maintenance Data to GCSS-A**
  - Required for future dynamic troubleshooting and prognostics capability
  - Suggestions
    - *Expand the MIL-STD-2361 DTD to meet all MIL-STD-3008 data requirements*
    - *If information gathered would increase soldier productivity*
    - *May not be appropriate for IETMs in less complex systems*
- **Require Individual Login**
  - Identifies
    - *Required information for maintenance data collection*
    - *Tailor/filter data to*
      - **User's skill/maintenance level**
      - **Equipment configuration**
    - *Personal annotations/notes*
    - *User when embedded training is supported*
  - Concern requiring login are:
    - *Delay getting system operational in combat/emergency situation*
    - *Considered only needed if going over web*
    - *Requiring a password*

Survey Results
Metadata

- **Capabilities desired**
  - Support configuration
  - Filtering capabilities
  - Keyword search

- **Determine what is stored in the CMS and in the instance**

- **Look at what IEEE and AECMA are doing**

TROUBLESHOOTING METHODOLOGY

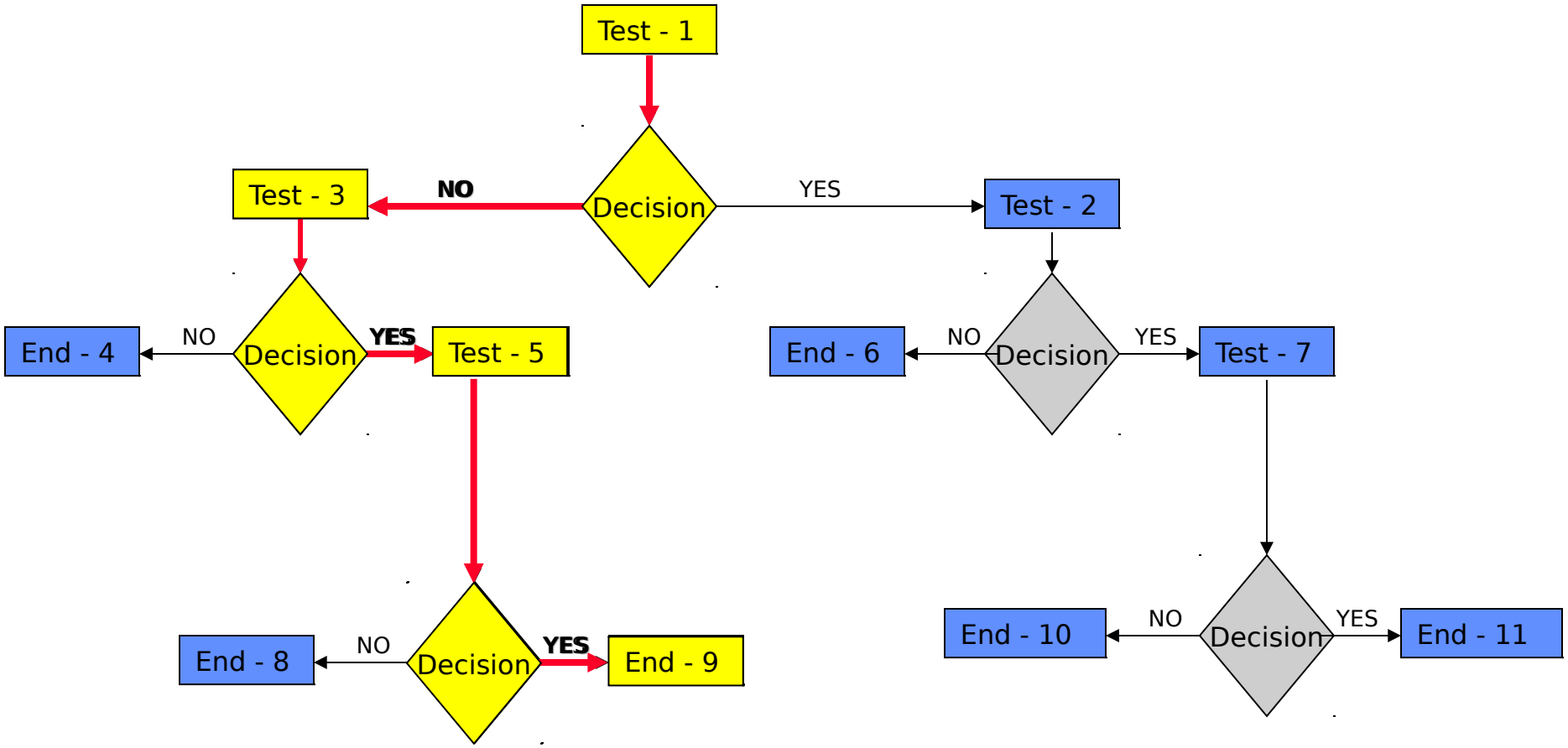
Troubleshooting Methodology

- **Static Troubleshooting**
- **Intrusive Diagnostics**
- **Dynamic Troubleshooting**
  - Inference Engine
- **Autonomic Logistics System (ALS)**
  - Prognostics and Health Management System
  - Joint Distributed Information System

Static Troubleshooting

- **Predetermined path to diagnosis faults as set by the author.**
- **MIL-STD-40051B/2361B DTD uses static troubleshooting.**

Static Troubleshooting



Intrusive Diagnostics

- Sensor or test equipment that automatically conduct tests, may isolate fault information, and returns error code or corrective action.

- LOGSA is working with AMCOM (IADS), TACOM (EMS), and ARDEC on adding this functionality to the standards.

Dynamic Troubleshooting

- **Troubleshooting that does not have a predetermined path**
- **Diagnostics may be dependent on**
  - **Maintenance history**
  - **Weighted Factors**
  - **Conditions (desert, artic, etc.)**
  - **Prognostics**
- **Currently will NOT be included in the standards**

Dynamic Troubleshooting

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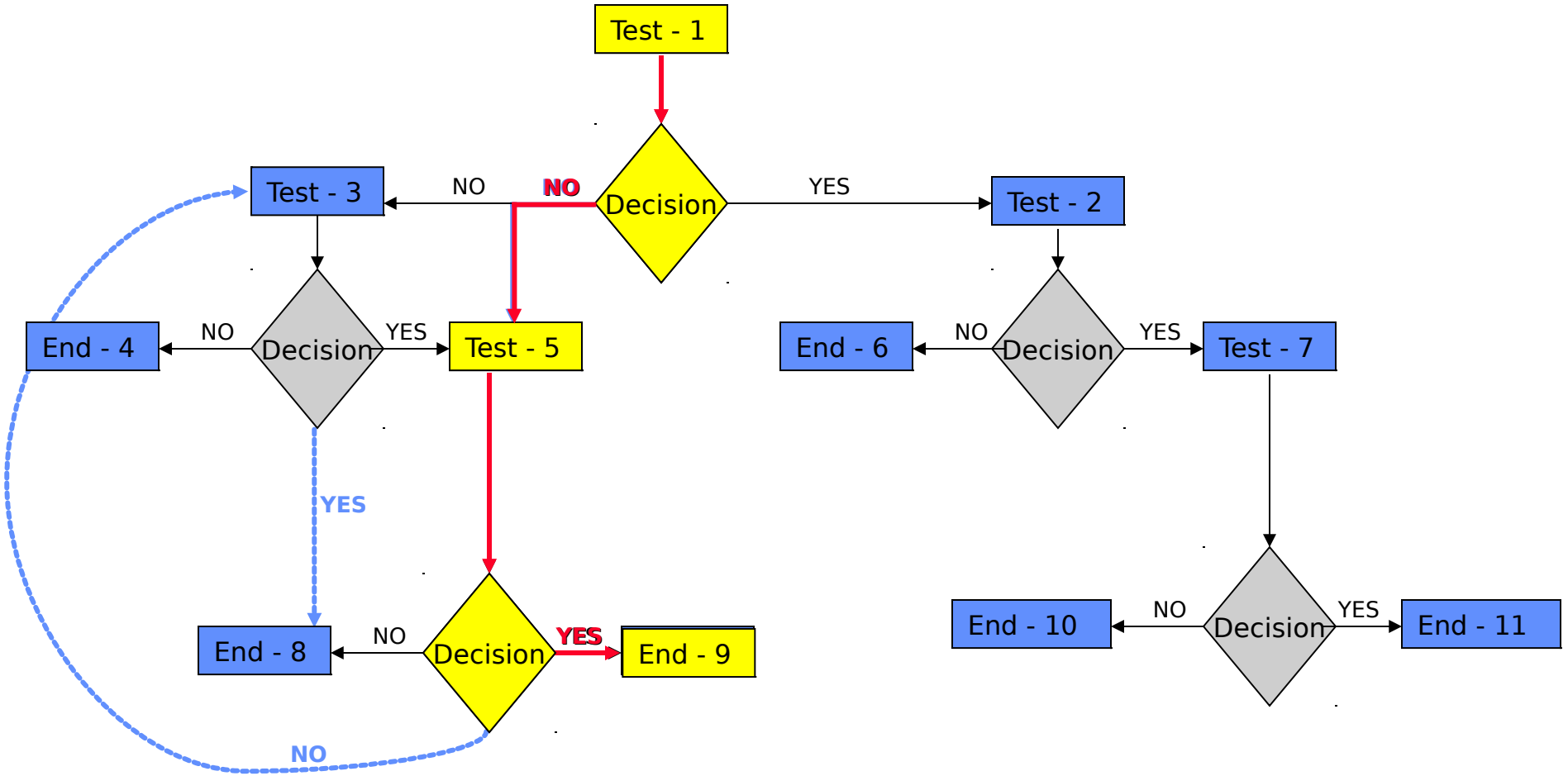
Nth Time Condition



Inference Engine

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A computer program that, based on user or other input, determines the correct sequence to display technical data in an IETM (also called a logic engine).

Autonomic Logistics System (ALS)

- **Acts without human intervention and consist of two primary components:**
  - **Prognostics and Health Management System**
  - **Joint Distributed Information System**

Prognostics and Health Management System

- Collects information while the weapon system is in operation using sensors and diagnostics to detect faults and impending faults.
- Reasoning algorithms are used to determine the causes of the faults.
- The system detects degrading performance and thus can forecast the requirement to replace a component prior to its predicted failure.

Prognostics and Health Management System

Army Status

- Currently TACOM is developing a demonstration/prototype
- Waiting on GCSS-Army implementation
- MIL-STD-3008 provides the data interface requirements to GCSS-Army
- Limited bandwidth to communicate logistic data real time

Joint Distributed Information System

- Communicates health status information immediately through the logistics infrastructure that automatically acquiring the
  - Spare parts
  - Tools
  - Manpower
- Prepared to perform the corrective action when the weapon system has completed the operation
- Inventory management and control

JOINT SERVICE PUBLICATION

Joint Service Publications

- **CECOM interview requests review joint publication requirements**
  - **MIL-PRF 63010, TMs for DOD Std Generator Sets**
- **USMC adopting MIL-STD 40051/2361**
- **Additional requirements are needed**

Joint Service Publications MIL-PRF 63010

- **The RPSTL**
  - Permit different SMR code for each service
  - USMC need data quantity per equipment
  - RPSTL introduction additional narrative

- **General Information Reference Statements**
  - Maintenance forms and records
  - Reporting of errors.
  - Shipment and storage
  - Equipment Improvement Recommendation

- **Title Page**

Joint Service Publications RPSTL

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(1)	(2) SMR CODE				(3)	(4)	(5)	(6)	(7)
ITEM NO	a. ARMY	b. AIR FORCE	c. NAVY	d. USMC	FSCM	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY	USMC QTY PER EQUIP
							GROUP 04 -OUTPUT BOX ASSEMBLY		
							FIG.11 OUTPUT BOX INSTALLATION		
1	PAOZZ	PAOZZ		PAOZZ	81205	2740-0003	. NUT, PLAIN, ASSEMBLED	7	374
2	PAOZZ	PAOZZ		PAOZZ	19207	12325869	. BOLT, MACHINE	6	300
3	PAOZZ	PAOZZ		PAOZZ	96906	MS35207-269	. SCREW, MACHINE	1	1
4	XDOZZ	XB		XBOZZ	30554	88-20036	. SPACER, TRAY, OUTPUT	1	1

Different SMR Code

USMC Requirement

RECAPITALIZATION NATIONAL MAINTENANCE PROGRAM

TWO LEVEL MAINTENANCE

RECAP/NMP
Two Level Maintenance

- **APD and LOGSA concluded after the interview with the National Maintenance Office (NMO) that MIL-STD 40051**
  - **Does not require a change or revision for Recapitalization (RECAP)**
  - **Provides the requirements and guidance for DMWR and NMWR**
  - **Requires a follow-up review that NMP requirements are adequately covered**

- **Conclusion on Two Level Maintenance (Field and Depot)**
  - **NMO is presently studying, but not DA approved**
  - **Until approved by DA, will not impact MIL-STD 40051**

DMWR to NMWR

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AMCLG (750-1)
NMP Implementation Guidance – Update 1

- **"There never was any intent or requirement to take an existing DMWR and revise/rewrite it into a NMWR."**
- **"New guidance is NMP overhaul standards for components with a maintenance repair code (MRC) of "D" or "L" (depot level repairable) will be documented in a DMWR and components with an MRC of "F" or "H" (field level repairable) will be documented in a NMWR."**
- **"Existing DMWR will not normally be converted to a NMWR. If a DMWR revision is required, the publication will be re-issued as a DMWR. As an exception, if the review of the component results in recoding from DLR to FLR, the standard will be**

Points of Contact

MIL-STD 40051
Functional Requirements

- John Zebell
  Logistics Support Activity (LOGSA)
  256-955-9852
  john.zebell@us.army.mil

- Rebecca Armstrong
  Logistics Support Activity (LOGSA)
  256-955-0852
  rebecca.armstrong@us.army.mil

- Obtain – www.logsa.army.mil
  - *MIL-STD 40051B*
  - *MIL-HDBK 1222B*

MIL-STD 2361
Interface Requirements (DTD)

- Patrick O'Neill
  Army Publishing Directorate (APD)
  703-428-0504
  patrick.o'nell@hqda.army.mil

- Army SGML/XML Registry and Library (ASRL)
  Help Line - 1-800-880-3773
  Obtain - www.asrl.com
  - *MIL-STD 2361B*
  - *DTD*